

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

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file

ADOPTED: October 19, 1959

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CAPITAL AIRLINES, INC., VICKERS-ARMSTRONGS VISCOUNT, N 7463,
NEAR CHASE, MARYLAND, MAY 12, 1959

SYNOPSIS

About 1613, May 12, 1959, Capital Airlines Flight 75 disintegrated in flight over an area near Chase, Maryland. All occupants, 4 crew and 27 passengers, were killed. The aircraft, a Vickers-Armstrongs Viscount, N 7463, was destroyed.

From all of the available evidence the Board believes that the inflight disintegration was caused by aerodynamic loads imposed on the aircraft which exceeded its design strength and which were generated by an excessive airspeed combined with turbulence and maneuvering loads. Based upon the evidence the Board concludes that there was a loss of control in extreme turbulence in the area of thunderstorms and, after a steep involuntary descent during the subsequent recovery, loads beyond the design strength of the aircraft occurred.

Following the preparations for Flight 75 Capital Airlines dispatch had received additional weather information affecting the route of flight. This information was the first that delineated the location of a potential squall line along the route and indicated that the severity of thunderstorms along the line was increasing. Although it was known that Flight 75 did not have the assistance of operable radar no action was taken by dispatch to ensure that the flight had received this information. The Board considers this information would have been valuable to the flight.

Investigation

On May 12, 1959, Capital Airlines Flight 75 was scheduled from La Guardia Field, New York, to Atlanta, Georgia, departing at 1500 1/ and arriving at 1755. The assigned crew was Captain W. C. Paddock, First Officer M. J. Flahaven, and Hostesses D. Gulick and S. Wessell. Company crew histories, training records, and recurring proficiency checks showed the crew members were properly qualified and certificated for their respective positions. Captain Paddock had flown more than 22,000 hours.

The day of the accident N 7463 was originally scheduled for Trip 79; however, writeups that the No. 2 engine operated with an excessive tailpipe temperature required it be removed from the assignment to change the No. 2 fuel control unit and high pressure fuel pump. This work corrected the trouble and was completed early in the afternoon. The plane was then rescheduled to operate as Trip 75 and serviced to 14,500 pounds of kerosene and 60 gallons of water-methanol.

1/ All times herein are eastern standard based on the 24-hour clock.

A review of the company service and maintenance history indicated the aircraft had been maintained properly and was in an airworthy condition for Trip 75. The airborne weather radar was inoperative; however, it was not a required item under existing regulations or by company policy.

Captain Paddock and First Officer Flahaven arrived at La Guardia about 1240 as the pilots of Capital Flight 220 from Detroit. Evidence obtained during investigation revealed they remained at the airport between flights and that they seemed to be in good health and spirits. Both were observed in and about the crew lounge and engaged in the preparations for Trip 75. Captain Paddock spoke with ground personnel about the maintenance work on N 7463 and was later seen watching the plane being serviced. The first officer was observed just before flight time walking around the aircraft, obviously preflighting it.

Flight 75 taxied away from the terminal at 1520, 20 minutes late. The last-minute delay occurred when Captain Paddock found an error in the aircraft gross weight computation and questioned the weight for the existing runway restriction. At 1455 the flight radioed for runway temperature. The senior operations agent came aboard and he and the captain rechecked the computations to make sure the weight was correct and below maximum allowable for the runway length, the existing surface wind, and temperature. The problem was satisfied and it was determined that the gross weight was 60,507 pounds, 103 pounds less than the maximum allowable of 60,610 pounds.

During taxi Flight 75 was issued an instrument clearance according to an instrument flight rules flight plan filed earlier. At 1529 a normal takeoff from runway 22 was observed. Executing the clearance, Flight 75 made numerous radio communications in the New York area and proceeded uneventfully to its assigned cruising altitude, 14,000 feet, and onto the assigned airway, Victor 3. Regular position reports were made as the flight progressed.

At 1602 Flight 75 contacted the Washington Center. It reported that it was over Westchester on the hour, 1600, at 14,000, estimating Westminster at 1617, with Herndon next. In the same message it advised, "... ah, we've got a pretty good string of thunderstorms along that course . . . ah, if we could stay in the clear and stay a little bit south of Westminster, is that O. K. with you?" The center controller replied, "Capital 75, that'll be all right and report passing Westminster." The flight acknowledged. At 1610 the flight advised, "Ah, Washington Center, this is Capital 75, we've reduced to one seven zero knots account rough air." This was the last message from the flight on the center recorders and the last which could be determined as having been made.

More than 100 eyewitnesses to the accident were interviewed and most provided written accounts of their observations. It was immediately evident that most were attracted by the inflight breakup itself and comparatively few saw the aircraft both before and during the inflight disintegration. With so many accounts, some varied or could not be correlated with a preponderance of other information. The majority, however, were consistent with other phases of the Board investigation and provided valuable information.

According to the evidence, just prior to the disintegration the aircraft was flying southwest at an altitude estimated as between 3,000 and 7,000 feet. A majority believed it was flying in a straight and level attitude and at a normal

speed. At the time of disintegration it was in a clear area between clouds and near large thunderstorm buildups.

Of those who saw the aircraft just before and during the breakup one was attracted by a loud engine or propeller noise, another said the sound was surging. Several saw a fire just before the breakup. Two placed it near the right wing root, another on top of the cabin, and another just in front of the tail. Most, however, said the only fire was a large flash explosive fire that occurred simultaneously with the inflight disintegration.

At least three eyewitnesses said the aircraft was struck by lightning and then it exploded; . majority held that no lightning was involved.

Observers were most consistent that the right wing separated first, and instantly thereafter the remaining aircraft structure broke into three major sections. All agreed that most of the pieces fell to the ground in flames.

From those witnesses who could relate the accident to a specific time reference it was reliably determined that it occurred very close to 1613.

Since most who saw the aircraft break up estimated it was between 3,000 and 7,000 feet when it disintegrated instead of 14,000 feet, the assigned and last reported altitude, a flight test was made to determine the approximate altitude. A Capital Viscount was flown several times along the probable flight course of N 7463, at different altitudes from 3,000 to 14,000 feet while 11 eyewitnesses watched from their original positions. Each designated the pass on which the altitude of the test plane was closest to that of N 7463 when it disintegrated. The result averaged 5,500 feet.

The main wreckage was located about 2 miles northeast of Martin Airport near Chase, Maryland. The area is 49 nautical miles from the Westchester omni on a magnetic heading of 236 degrees. The heaviest portions of structure were found concentrated in a localized area showing an instantaneous breakup of most of the aircraft, although many lighter and smaller pieces were drifted by northwest winds and deposited along a southeast path about 2-1/2 miles long. Some of this latter structure fell into swamp and heavily wooded areas and some into shallow inlets of Chesapeake Bay. An exhaustive search, greatly assisted by several civil and military organizations, resulted in recovery of about 90 percent of the aircraft structure which was then moved to a hangar, laid out, and given meticulous examination.

The empennage structure was localized about one mile southeast of the main wreckage concentration. Examination of this structure showed both the left and right horizontal stabilizers failed downward along a chordwise line near the No. 2 elevator hinge. The stub end of the left stabilizer was torn from the fuselage by forces predominantly rearward and downward. The remaining portion of the right stabilizer remained attached to the fuselage; however, the lower surface was wrinkled in the area adjacent to the fuselage. The upper surface was wrinkled at the root just forward of the spar and the wrinkle continued into the aft fuselage. Both elevators were torn off in sections by forces causing failures at the hinge points. The vertical fin was torn off by forces predominantly to the left. It separated, tearing with it part of the fuselage attachment frame at station 870.

The rudder separated from the fin at the hinge points and was broken into four sections, one of which was not recovered.

The empennage surfaces were unmarked by fire although fuselage structure located immediately ahead was heavily sooted by fire.

The right wing separated in flight. It broke downward along a chordwise line near the wing root. This wing panel fell in flames, was damaged by ground impact, and partially consumed by fire.

The left wing outer panel separated in flight along a chordwise line in the area of the No. 1 engine nacelle. This panel separated from forces that failed the wing spar forward. Between the Nos. 1 and 2 nacelles the wing panel was broken into several sections, the spar was bowed downward, and the upper wing skin was failed by tension loads. Near the inboard fracture line the wing spar failed rearward. The stub end of the left wing and wing center section remained attached to the center fuselage. Evidence showed that the left wing separation and breakup, which tore open fuel cells, was accompanied by an intense flash fire. The left outer wing panel fell in flames and continued to burn on the ground until it was nearly consumed.

The landing gear was retracted and locked; flaps were up.

The fuselage broke up in flight into three principal sections. These, in general, were the cockpit and forward passenger cabin, the cabin rearward to the last row of seats, and the aft fuselage from the last row of seats to the area below the vertical stabilizer. Much of the fuselage shell and overhead structure tore away in small pieces. These were found scattered over the full 2-1/2-mile long wreckage path.

Examination of all passenger seats, except one not recovered, showed they had been subjected to positive loads. Because these were opposite to the loads imposed on the seats during breakup, they obviously occurred earlier.

Nearly the entire left side of the fuselage was sooted by fire and in areas of the heaviest deposits paint was blistered. Study showed this occurred after many pieces tore away because some pieces normally located next to those that were sooted were clean. Comparatively, the right side of the fuselage showed little exposure to fire.

In other areas of inflight fire damage there was much evidence of a flash fire during the breakup; there was no evidence that a fire or explosion preceded the disintegration. The wreckage was also examined for evidence of a lightning strike. It was not possible to conclude that lightning did not strike the aircraft; however, it was conclusively established that there was no significant damage to the aircraft as a result of a lightning strike.

All four powerplants separated from the aircraft about the same time and fell reasonably close to each other in the main wreckage area. Examination showed that the nacelles failed at their attach point to the wing as the result of uploads, although downloads had occurred prior to separation. The latter caused damage to the propeller reduction gearing assemblies and to the "W" struts.

Examination revealed nothing which indicated malfunction or failure of the engines prior to the breakup sequence. There was no indication of operational distress, inadequate lubrication, or overheating. On the other hand, there were clear indications that all of the engines were operating when they tore off. The Nos. 2 and 4 fuel-trimmer actuators were positioned for reduced power.

Each propeller, except No. 3, was found attached to its respective engine. No. 3 separated in flight and was found about 775 feet from its engine. Examination indicated separation occurred when the No. 3 propeller blades struck a heavy object during the inflight breakup. This gouged the blades and caused a torsional failure of the engine reduction gearing coupling shaft. The blow also caused an elongation of the propeller blade operating dowel pin holes at a position which showed a propeller blade angle of 52 degrees.

At ground impact the No. 1 propeller blades were positioned about 24 degrees; No. 2, about 29 degrees; No. 3, about 6 degrees; and No. 4, 16 degrees. Propellers Nos. 3 and 4 were in the ground fine pitch range. These positions, because of the numerous safeguards that prevent ground fine pitch from occurring in flight, were determined to have resulted from free fall and impact forces. Consequently, only the blade angle of the No. 3 propeller was considered valid and significant.

A review of the original certification process for the British-manufactured Viscount showed it was built to conform to the British Civil Air Requirements and issued a British airworthiness certificate. The Federal Aviation Agency, then CAA, reviewed the specifications and requirements and, when satisfied that an adequate standard of airworthiness existed, accepted the British certificate and issued the aircraft the U. S. airworthiness certificate. This process was carried out under the terms of Executive Agreement 69 of October 17, 1954. It was stated by both representatives of the British and U. S. that the strength requirements of each country are substantially the same and the Viscount met or exceeded both.

The recommended rough air penetration speed for the Viscount is about 170 knots, the last airspeed reported by Flight 75. At or near this speed the aircraft strength is sufficient that extreme maneuver and/or gust loading will stall the aircraft rather than cause a structural failure.

Autopsies were performed on all of the crash victims according to provisions of the law of the State of Maryland. At the public hearing the Chief Medical Examiner testified relative to the findings in order that the Board could avail itself of every facet of information relevant to the accident. The findings indicated that all of the occupants of the plane were killed by impact with the ground, although about 20 passengers had sustained ante-mortem injuries. The majority of the ante-mortem injuries were described as scalp injuries of the type and degree which suggested heavy bumps on the head by contacting overhead structure. Others were seat belt injuries and two or three suggested forces applied downward on the body forcing it into the passenger seat. The findings showed that some passengers were exposed to an intense flash fire which contained droplets of flaming liquid. At least 10 passengers revealed an elevated level of carbon monoxide; the highest was about 10 percent, not normally a disabling amount. The medical Examiner said the time required to attain the levels found was difficult to determine. Depending on several factors, the time could vary from eight seconds to several minutes. He indicated that the relatively few bodies showing carbon monoxide was consistent with a short period of exposure during which some passengers were affected while others in the immediate area were not. The medical

findings indicated none of the persons was struck by lightning.

The findings indicated the pilots had no preexisting physical condition which would impair normal duties and nothing suggested that pilot incapacitation was a factor in the crash.

Board investigators found no evidence in the medical information that was inconsistent with the physical examination of the aircraft. In fact, the information was in accord with evidence found during other phases of the accident investigation.

At 1600 a cold front existed along a line from Philadelphia to Baltimore to near Gordonsville, Virginia. Regional forecasts issued by the Weather Bureau in Washington at 0700 and 1300 and the area forecast 2/ issued by the Weather Bureau at Idlewild at 1400 drew attention to the possibility of locally severe thunderstorms and extreme turbulence associated with the front. The front was forecast to be virtually stationary. The 1400 area forecast also stated there was the possibility of a squall line development in advance of the front.

At 1415 the Idlewild Weather Bureau office issued the following flash advisory. "Line of scattered thunderstorm activity near Martinsburg-Harrisburg-Poughkeepsie northeastward is moving eastward about 20 knots accompanied by severe turbulence and conditions locally below 1,000, visibility 2 miles. This line will move to near Providence-New York City-Philadelphia by 1800 increasing in intensity during afternoon. Valid until 1815." The Capital meteorologist located in Washington marked off the areas covered by the advisory on a blackboard chart located on one wall of the dispatch office. The advisory was also available on the teletypes at the dispatch sectors positions in the office.

During the afternoon radar reports were issued about hourly from Andrews AFB weather. These reports described the locations of the thunderstorms and indicated they were increasing in intensity during the afternoon along the New York-Washington route of Flight 75. These reports were also on teletype machines located in Capital dispatch at the sector positions.

About 1548 the cold front passed the Baltimore-Chase area. It was indicated by a pronounced wind shift in about two minutes, a pressure jump of .08 inches of mercury in 20 minutes, and wind gusts to about 45 knots.

According to the Civil Air Regulations and the Capital Airlines Operations Manual, dispatch may cancel or divert a flight on the basis of existent or anticipated adverse weather conditions. The captain of a flight has this authority and under emergency conditions may take such action as he considers necessary in the interest of a safe operation. Dispatch is also required to furnish the en route pilot any additional available information concerning meteorological conditions which may affect the safety of a flight.

2/ Volume 3 of the Weather Bureau Manual states: "Flash Advisories deal solely with potentially hazardous weather within a period of 2 to 4 hours in advance while Aviation Area Forecasts include potentially hazardous weather plus other operationally significant weather for a period of 12 hours plus an outlook for the next 12 hours . . . Flash Advisories will automatically amend the outstanding Aviation Area Forecasts for the period of the Flash Advisory."

No action was taken by dispatch to furnish the flash advisory or radar information to Flight 75. Dispatch did not know if Captain Paddock had received the advisory prior to departure. It was stated by dispatch personnel that they believed the flash advisory indicated improved conditions over those previously forecast and that all of the weather data indicated the thunderstorms were scattered, thus circumnavigable.

With respect to providing an en route flight weather information, one dispatcher said, "If the trip is operating in a scattered thunderstorm condition, the likelihood of any extended period in solid cloud is almost negligible. If he is operating where you would expect solid IFR conditions, it is a condition that requires all of the information he can get." It was stated that because many Capital aircraft are not radar equipped there was no distinction in the information furnished the en route flight based on this equipment.

Following the accident a study of the weather conditions prevailing in the accident area at the time of the accident was made by a U. S. Weather Bureau research meteorologist. The results of this study showed there were large rapidly developing thunderstorms in the vicinity of Martin Airport, located about 2-1/2 miles southwest of the accident area. Utilizing several techniques it was also determined that extreme turbulence ^{3/} most probably existed at 14,000 feet in the thunderstorm cells and areas around them. It was also shown that extreme turbulence may exist not only in the thunderstorm cell but up to five miles around it.

The pilots of another Viscount observed Flight 75 deviate at the Westchester omni. At that time these pilots, using radar, noted no indications of severe thunderstorm cells on airway V-3. Consequently, they continued on the airway and experienced no difficulty. An executive pilot also stated that from a location north of the accident scene he observed a severe thunderstorm cell on airborne weather radar near the accident scene. He described it as twice as strong as any other in the vicinity. He immediately altered course to avoid it. Still another pilot operating according to visual flight rules reversed course in the accident area to avoid instrument conditions of a thunderstorm.

Analysis

On the basis of all the available evidence it is the Board's analysis that the inflight disintegration occurred as the result of loads imposed on the aircraft which exceeded its design strength. It is the Board's opinion that the forces were from a high indicated airspeed in turbulence. The Board believes that this airspeed was generated during an involuntary descent from 14,000 feet which followed loss of control of the aircraft in extreme turbulence. The Board is convinced that no preexisting weakness or condition contributed to the break-up and that no malfunction or failure of the aircraft, its systems, or its components led to the circumstances under which the disintegration occurred.

From examination of the major fractures, breakup patterns, and from design considerations it is believed that the initial failure in the destruction sequence was the nearly simultaneous downward failure and separation of the horizontal stabilizers at the No. 2 hinge points. This is confirmed by the fact that the symmetrical stabilizer failures could only occur with both wings intact. Also, under ultimate loadings on the aircraft the stabilizers would be expected to fail

^{3/} Extreme turbulence is defined by NASA as a rarely encountered turbulent condition in which the aircraft is violently tossed about and is practically impossible to control. It may cause structural damage.

first. Furthermore, the breakup sequence and the nature of the mass of fractures are entirely consistent with this as the initial occurrence.

Following separation of the right and left stabilizers the aircraft pitched down violently so that all four nacelles broke upward from combined inertia and gyroscopic loads. Immediately thereafter both wings were subjected to extreme downloads under which the right separated and the structural integrity of the left wing was destroyed. With the nacelles, right wing, and stabilizers gone, drag induced by the left wing yawed the fuselage violently to the left. Forces to the left tore off the vertical fin with portions of the fuselage attached, the latter already weakened when the left stabilizer stub tore away. During the subsequent gyrations the left wing broke up, its fuel cells were opened, and the flash fire occurred. At the same time the remaining fuselage disintegrated. The Board believes that the major disintegration sequence took less than one second and that during the latter part of the sequence occupants of the plane were exposed in a random manner to the flash fire and attendant high concentration of carbon monoxide.

The high indicated airspeed which the Board believes existed at breakup is suggested by several singular factors which, in their cumulative value and with the overall patterns of evidence, make the existence of excessive speed nearly irrefutable.

An important consideration is that unless an airspeed in excess of cruising was present the strength of the Viscount is such that forces causing the horizontal stabilizer failures which occurred cannot be developed. Below cruising speed the horizontal tailplanes will stall at loadings less than those necessary to cause failure.

The high indicated airspeed is also suggested by the structural damage to the passenger seats, propeller reduction gearing assemblies, the engine mount "W" struts, and possibly by the ante-mortem injuries to two or three passengers. The damage and the injuries resulted from pullup loads which were in the opposite direction to the loads imposed on these subjects by the breakup forces. This damage had to be made prior to the breakup and is compatible with a descent in which high speed was attained, followed by a recovery in rough air in which positive "g" forces had to have occurred.

A further indication of an excessive airspeed and one more definitive of the amount was the blade angle of the No. 3 propeller, 52 degrees. It is believed the indications of blade angle were made during breakup, therefore, airspeed calculated from the blade angle would be valid at that time. From technical data relating to airspeed and propeller blade angles it was shown that with the 52-degree angle there is no throttle position at which true airspeed could be less than 295 knots. Because this airspeed is excessive it is entirely logical to assume the throttles would have been closed to slow the aircraft. With the throttle closed a 52-degree blade angle reflects a true airspeed of 335 knots, which is 15 percent in excess of the Viscount never-exceed speed or about 5 percent in excess of V_D , the maximum speed demonstrated in certification. Loads at such an airspeed, combined with gust and/or maneuvering load, could easily exceed the strength of the aircraft.

From the evidence of a high airspeed, combined with pullup forces already discussed, it is the Board's opinion that an involuntary descent occurred before the inflight disintegration. The foregoing conclusion is supported by the fact that the breakup occurred at about 5,000 feet and it is not reasonable, under the

circumstances, to believe that a voluntary descent would have been made. The configuration of the aircraft at breakup - gear up and flap retracted - is also inconsistent with a voluntary descent under the turbulent conditions known to have existed. Finally, believing that Flight 75 was at 14,000 feet about 1610 and that the aircraft disintegrated some 5,000 feet above the terrain about 1613, a descent of 9,000 feet in three minutes or less is evident. Again, a descent occurring under these factors of time and altitude would not be less than 3,000 feet per minute and not less than V_{ne} . This evidence serves to confirm the aforementioned speed indicated by the propeller blade angle.

The evidence clearly shows the existence of large, rapidly developing thunderstorms in the area of the accident and that extreme turbulence most probably existed in and around the thunderstorms. From all evidence the Board firmly believes extreme turbulence was encountered and a loss of control occurred resulting in an involuntary steep descent. During the final stages of the recovery loads in excess of design strength were imposed on the aircraft causing disintegration.

The Board knows of no evidence in this accident from which it can determine the sequence of events and factors immediately attending the situation in which loss of control of the aircraft occurred at 14,000 feet. Such factors may be numerous and varied. The Board recognizes the possibility that Captain Paddock may have been attempting to cross the line of thunderstorms to reestablish the flight on V-3 airway. In doing so he may have selected an opening in the thunderstorms which closed causing loss of visual reference and then entered a thunderstorm which was obscured. It is considered possible under a similar occurrence that Captain Paddock attempted to maneuver out of such a situation and placed the aircraft in a turning configuration in which the aircraft could more easily be placed in an unusual attitude and in which control techniques would be more critical. Under any consideration the pilot's technique and psychological approach to thunderstorm penetration are important factors. In its considerations the Board was also unable to rule out with complete definitiveness the possibility of a cockpit distraction or instrument failure at a critical moment.

Because Flight 75 was released at 1435 with 1400 weather attached to the release and because the crew was apparently at the aircraft considerably before flight time, the Board believes that Captain Paddock did not receive the 1415 flash advisory. While the flight was en route no action was taken to ensure the flight had this information or to provide it with available radar information concerning thunderstorms along the route. The advisory would have delineated the position and movement of the line of thunderstorms along the route and would have indicated that they were expected to increase in intensity. Radar information could have indicated the individual positions of the thunderstorms. While it is not possible to state the action Captain Paddock would have taken had he received the information the Board believes it would have supplemented substantially what he could see, thus providing him with more information on which to base his decisions. Certainly, according to the carrier's operations manual, this information fitted the description of information which should be furnished a flight.

Conclusions

From all the evidence the Board concludes that Flight 75 deviated at the Westchester omni to circumvent thunderstorms which were visible on the airway of intended flight. At 14,000 feet and at reduced airspeed a course of about 240 degrees was followed which closely paralleled a line of thunderstorms associated

with a cold front. The Board concludes that the flight penetrated an area of extreme turbulence in the immediate vicinity of a severe thunderstorm which resulted in loss of control of the aircraft. This resulted in an involuntary descent during which high airspeed was generated. Aerodynamic loads from the airspeed, recovery, and turbulence then exceeded the design strength of the aircraft, causing it to disintegrate.

The Board concludes that Captain Paddock did not receive the 1415 flash advisory prior to departure and that dispatch did not pass this and other available weather information to him en route. It is believed that the information would have materially assisted the captain in his appraisal of the situation and thereby given him more information on which to base his operational decisions. From this nonaction the Board must conclude that Capital dispatch did not assist the pilot to the ultimate of its capability.

The Board fully recognizes that there are many factors in adverse weather phenomena that are difficult to assess accurately. The Board has therefore advocated every practical assistance to pilots transporting the public. The Board believes that aircraft radar has proved to be such an assistance, particularly in modern high-performance aircraft. While it is impossible to predict precisely the action which would have been taken by the captain had the airborne radar been operable, there is evidence to indicate the likelihood that the area of turbulence could have been avoided through the use of airborne radar. The Board therefore concludes that the provision of airborne radar on such aircraft would enhance aviation safety.

Probable Cause

The Board determines that the probable cause of this accident was a loss of control of the aircraft in extreme turbulence resulting in an involuntary steep descent following which aerodynamic loads from high airspeed, recovery, and turbulence exceeded the design strength of the aircraft.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE
Chairman

/s/ CHAN GURNEY
Vice Chairman

/s/ HARMAR D. DENNY
Member

/s/ G. JOSEPH MINETTI
Member

S U P P L E M E N T A L D A T A

Investigation and Hearing

The Civil Aeronautics Board was notified of this accident shortly after occurrence. Investigators were immediately dispatched to the scene and an investigation was conducted in accordance with the provisions of the Federal Aviation Act of 1958. A public hearing was held in the Southern Hotel, Baltimore, Maryland, on July 8, 9, 10, 1959.

Air Carrier

Capital Airlines, Inc., is a Delaware corporation and maintains its principal offices in Washington, D. C. The corporation holds a current certificate of public convenience and necessity issued by the Civil Aeronautics Board to engage in the transportation of persons, property, and mail. It also possesses a valid air carrier operating certificate issued by the Federal Aviation Agency.

Flight Personnel

Captain William C. Paddock, age 53, was employed by Capital Airlines on October 1, 1930, and was promoted to captain June 6, 1938. He held a valid airman certificate with an airline transport rating for airplane, multiengine land, and DC-3, DC-4, Lockheed Constellation, and Vickers Viscount aircraft ratings. Captain Paddock had accumulated 22,260 flying hours, of which 1,945 were in the Viscount. His last first-class physical examination, taken on December 13, 1958, was satisfactory, with no waivers. His last semiannual proficiency check of November 23, 1958, and his last line check of January 19, 1959, were satisfactory.

Copilot Michael J. Flahaven, age 27, was employed by the company on April 18, 1955. He held a valid airman certificate with an airline transport rating for airplane, multiengine land and aircraft rating for the DC-3. Mr. Flahaven was qualified as captain on DC-3 aircraft April 22, 1958. He had accumulated a total of 4,073 flying hours, of which 2,033 were as copilot on the Viscount. His last first-class physical examination of November 24, 1958, was satisfactory, no waivers. His last proficiency check and instrument certification was satisfactorily completed December 15, 1958.

Hostess Doris E. Gulick was employed July 20, 1952. Hostess Sue Ann Wessell was employed April 26, 1957.

The Aircraft

Vickers-Armstrongs Viscount, model 745D, N 7463, bore manufacturer's serial number 287. It was manufactured December 8, 1957, and purchased by Capital Airlines January 25, 1958. Since new the aircraft had accumulated 4,180 hours. The aircraft was powered by Rolls Royce Dart engines, model 510, which were equipped with Rotol propellers, model (c) R 130/4-20-4/12 with RA 25842 blades.